



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/014,519 | 12/14/2001 | Betty Wu | 19662-029001 | 3927 |
| 26161 | 7590 | 10/16/2006 | EXAMINER | |
| FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022 | | | SINES, BRIAN J | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1743 | |
| DATE MAILED: 10/16/2006 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|--------------------------|------------------------|---------------------|--|
| Interview Summary | Application No. | Applicant(s) | |
| | 10/014,519 | WU ET AL. | |
| | Examiner | Art Unit | |
| | Brian J. Sines | 1743 | |

All participants (applicant, applicant's representative, PTO personnel):

(1) Brian J. Sines. (3) _____.

(2) R. Bone. (4) _____.

Date of Interview: 11 October 2006.

Type: a) ☒ Telephonic b) ☐ Video Conference
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.
If Yes, brief description: _____.

Claim(s) discussed: present claims.

Identification of prior art discussed: N/A.

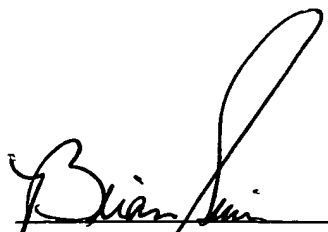
Agreement with respect to the claims f) ☒ was reached. g) ☐ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: The non-final action, mailed 9/22/2006, is vacated due to the subsequent notice of allowance, mailed 10/2/2006. Typographical errors were corrected in the specification on page 3 (see attached). Claim 21, in line 2, was amended to recite the second gas actuator. Claim 21 was corrected to depend from claim 16 before final claim renumbering. Claim 46 was corrected to depend from claim 45 before final claim renumbering.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.


 Examiner's signature, if required

material from the cells. These elements preferably operate differently from a valve, which would completely obstruct passage of material between upstream and downstream locations adjacent the valve. Rather, they typically provide resistance to fluid flow at a desired location (the lysing position) to thereby control fluid placement.

5 In one embodiment, the positioning element is disposed downstream of the lysing mechanism to position an upstream portion of a cell-containing sample (such as a microdroplet) in the lysing position. The positioning element preferably increases a surface tension of a downstream surface of the cell-containing sample to thereby inhibit downstream movement of the sample. For example, the positioning element may include an amount of
10 reduced-wetting material, such as a hydrophobic material, disposed to contact a portion of the downstream surface of the cell-containing microdroplet.

11 In another embodiment, the positioning element is disposed upstream of the lysing zone to position a downstream portion of the cell-containing microdroplet in the lysing position. The positioning element includes a vent, which substantially equalizes a gas pressure upstream of the cell-containing microdroplet with a gas pressure downstream of the cell-containing microdroplet to thereby stop downstream movement of the cell-containing microdroplet. When the microdroplet is in the lysing position. A valve is preferably
14 disposed to ^{subsequently} ~~subsequent~~ obstruct passage of gas between the lysing zone and the vent to allow an upstream gas pressure to once again move the droplet further downstream for additional processing. For example, the microfluidic system may include a mixing zone downstream of the enrichment zone and/ or lysing zone, to mix the microdroplet which emerges from these zones with a predetermined amount of reagent material.

15 In another aspect, the invention relates to a microfluidic substrate for processing the intracellular contents of cells suspended in fluids. The substrate includes a lysing module, a
25 microdroplet formation module, mixing module and an amplification module. The lysing module releases intracellular material from cells within the sample to thereby form a lysed sample. The microdroplet formation module then forms a first microdroplet of fluid from the lysed sample and forwards it to a mixing module for mixing with a microdroplet of reagent. The amplification module amplifies intercellular material within the microdroplet formed
30 from the mixture.